

GENDER DIFFERENCES OF STENT IMPLANTATION COMPLICATIONS. ASSESSMENT OF ACUTE CORONARY SYNDROME WITH ST ELEVATION

Lali Gujejiani, PhD Student

Nino Sharashidze, Full Prof.

Ivane Javakhishvili Tbilisi State University, Georgia

Merab Mamatsashvili, Full Prof.

Shalva Tvalchrelidze, MD

Clinic of Angiocardiology, Georgia

Iamze Taboridze, Associate Prof.

Grigol Robakidze University, Georgia

Lali Aladashvili, Full Prof.

Ivane Javakhishvili Tbilisi State University, Georgia

Rusudan Naphetvaridze, Full Prof.

Tbilisi State Medical University, Georgia

Abstract

The aim of study is the assessment of Gender differences of stent implantation procedure complications with ST elevation patients. Materials and methods: 110 patients with ST elevation of Ild ADAPTI angiocardiology hospital (2009-2010) were enrolled in the study. The stent implantations were performed. Among them were: 58 men and 52 women. The average age of men: 66.44 ± 4.78 , women: 66.65 ± 5.68 . In order to reveal the complications predictors, two groups were compared: the patients with complications and the patients without complications. The alternative test was also performed in order to assess the complications risk factors according to gender. Quantity data were compared according to - t (student) criteria and qualitative data – according to - F (fisher) criteria. Clinical data were processed with statistical programs package SPSS 16.0.

Results: There are essentially high indexes of the following risk factors in women: Hypertension – 53% and 77%, $p=0.0099$; Dislipidemia – 14% and 50%; $p=0.0000$ and hypotension before stent implantation – 16% and 38%; $p=0.0240$. EF is significantly higher in men then in women (accordingly 46.83 ± 9.435 and 41.04 ± 10.288 ; $p=0.00280$, but troponin I is less in men:

0.29±0.201 and 0.37±0.179, $p=0.0272$.) Stent implantation procedure complications were presented in men 63.64% and in women 61.54 %, also the frequency of procedure dissection was higher in men. (Men- 17% and women 4%, $p= 0.0244$.) . The data of LDA were higher in women group with complications – 58 % and 19% ($p=0.0045$), the damage of multiple vessels – 55% and 24 % ($p=0.0262$), hypertension – 87% and 62% ($p= 0.0348$), Diabetes Melitus – 55% and 24% ($p= 5.25$). The complication predictors were not revealed in men.

Keywords: Angiography, Myocardial infarction, Stent-thrombosis, Ventricular fibrillation, Coronary artery dissection

Introduction

One of the most effective methods of coronary revascularization is stent implantation of a damaged coronary artery. Effectiveness is caused due to the less traumatic cases and low frequency of complications. The mentioned method in Myocardial Infarction makes revascularization in the shortest period.

At present, technical progress causes minimal procedural problems, although some of the patients have complications.

Myocardium damage during the intervention is about 10-40 % and often it goes with the increase of markers and without symptoms manifestation [5], [6], [7].

Notwithstanding the fact that investigations of the procedural complications are actively performed, data about gender differences are few and even contradictory [1], [2], [3], [8], [11], [12].

The aim of our study is the assessment of gender differences during the stent implantation complications in patients with ST segment elevation according to gender. We aimed the following:

- To assess the presumable risk factors of complications after stent implantation.
- The statistical assessment of complications according to gender.

Materials and methods:

The patients involved in the study were 110 patients with ST elevation in 2009-2010 in LTD “ADAPTI” angiocardiology hospital. Stent implantation was performed. Among them were: 58 men and 52 women. The average age of men was 66.4 ± 4.78 years, as for women: 66.65 ± 5.68 .

Non randomized prospective study was conducted.

The enrollment criteria: stent implantation during the acute infarction with ST elevation.

The criteria of exclusion: other acute coronary syndromes, stable angina pectoris.

Investigation methods: Initial clinical assessment, echocardiography, electrocardiography, coronarography, blood clinical-laboratory and biochemical tests.

The following peri procedural complications were discussed: peri procedural ventricular fibrillation, peri procedural hypotension, coronary artery dissection, stent- thrombosis.

In order to reveal the complication predictors, the data of two groups of the patients were compared: the first group - the patients with complications and another - the group who had no peri procedural complications. Alternative test was also performed to assess the risk factors of complications according to gender.

The quantitative data assessment was done with t (student) criteria, as for the qualitative - by fisher criteria. The difference was reliable, when $p < 0.05$ [10]. The clinical materials were developed with the statistical programs package SPSS 16.0.

Study results: the direct stent implantation was done in men 62%, as for the 38% had angioplasty with stents implantation, but in women 50% direct stent implantation was performed, and in 50% angioplasty and stents implantation was made. The study of complications risk factor showed that the frequency of the patients with Hypertension, dislipidemia and hypotension before stent implantation is considerably high in women, but the frequency of smokers is high in men (Table 1).

The study showed that the average EF in men is significantly higher than in women (accordingly 46.83 ± 9.435 and 41.04 ± 10.288 ; $p = 0.0028$), but Troponin I is considerably less (0.29 ± 0.201 and 0.37 ± 0.179 , $p = 0.0272$).

Table 1 Statistical assessment of risk factors during Acute Myocardium Infarction according to gender

Risk factors	Men (n=58)		Women (n=52)		F	P
	mean	ST.dev	mean	ST.dev		
Smokers	0.64	0.485	0.42	0.499	5.24	0.0240
Dislipidemia	0.14	0.348	0.50	0.505	19.51	0.0000
Diabetes Melitus	0.33	0.473	0.42	0.499	1.06	0.3055
Renal failure	0.17	0.371	0.15	0.364	0.07	0.7950
COPD	0.21	0.409	0.15	0.364	0.51	0.4759
Hypertension	0.53	0.503	0.77	0.425	6.90	0.0099
AMI in anamnesis	0.41	0.497	0.58	0.499	2.94	0.0890
Stent implantation in anamnesis	0.28	0.451	0.27	0.448	0.01	0.9386
Bypass in anamnesis	0.31	0.467	0.25	0.437	0.49	0.4870
Fibrillation before stent implantation	0.36	0.485	0.23	0.425	2.26	0.1360
Hypotension before stent implantation	0.16	0.365	0.38	0.491	7.83	0.0061

Coronary anatomical characteristics for AMI with ST elevation are spread according to the scheme as follows: (Table 2).

The amount of infarction connected to LDA is considerably high; the same results are with RCX, as for the damage with RA is significantly higher in women.

There is a little difference with multiple vessels damage in both groups.

Table 2 Statistical assessment of coronary anatomical characteristics during Acute Myocardial Infarction according to gender

Damaged vessels	Men (n=58)		Women (n=52)		F	P
	mean	ST.dev	mean	ST.dev		
LDA	0.66	0.479	0.42	0.499	6.2	0.0144
RCX	0.48	0.504	0.35	0.480	2.1	0.1497
RA	0.33	0.473	0.58	0.499	7.2	0.0083
Multiple vessels damage	0.40	0.493	0.42	0.499	0.1	0.7800

In order to study the anatomical characteristics in ST elevation patients, we compared the evidences of damaged multiple vessels in two groups: without and with complications. In the group of women having complications the LDA damage was significantly higher - accordingly 58% and 19 % ($p=0.0045$) and multiple vessels damage – accordingly 55% and 24% ($p=0.0262$). As for men - the results in both groups were considerably different.

Totally stent peri procedural complications were 70 cases (63.64%) among them: 39 men (67.24%) and 31 women (61.54%). Ventricular Fibrillations were developed in men 45%, in women 54%. ($p=0.3494$), peri procedural hypotension in men 28%, in women 23% ($p=0.5918$), peri procedural dissection in men 17%, and in women 4% ($p=0.0244$), stent thrombosis in men 21%, in women 8% ($p=0.0543$). Also, dissection cases were significantly higher in men.

Flow changes after stent implantation are noted in the table N3. The average timi flow-2 after stent implantation is higher in women than in men, in men the timi flow-3 is higher than in women, but the timi flow index “1” in women was not found.

Table 3 The assessment of timi flow after stent implantation

	Men n= 58		Women n =52		F	P
	Mean	ST. Dev.	Mean	ST. Dev.		
Post –timi flow 1	0.10	0.307	0.00	0.000	5.89	0.0169
Post –timi flow 2	0.31	0.467	0.54	0.503	6.08	0.0152
Post –timi flow 3	0.59	0.497	0.46	0.503	1.71	0.1944

On another step of investigation we compared the risk factors inside the gender groups; two groups were compared - patients with peri procedural complications and without complications.

The predictors of peri procedural complications were defined among women: Hypertension in complications groups-87% and without complications group 62% ($p=0.0348$); Diabetes Mellitus - accordingly 55% and 24% ($p=5.25$).

In men, these data were not considerably increased in complications group than in group without complications.

Discussion

According to literature data, peri procedural complications after acute myocardial infarction and hospital mortality until 1993 were 3 times frequent in women than in men. According to the latest studies, the gender is not the independent predictor of stent implantations.

As a result of our studies, there are no differences according to gender of stent implantation peri procedural complications.

Among the complications fibrillation was the most frequent, but peri procedural dissection was found in less cases. Also, the considerable difference among gender was found only in one case; the frequency of peri procedural dissection was significantly higher in men.

Artery hypertension in >65 age is more in women (4). The study showed that in patients with hypertension, dislipidemia and hypotension before stent implantation was considerably higher in women, but the frequency of smokers is higher in men.

Among women the peri procedural complications predictors are arterial hypertension and Diabetes Mellitus, but in men it was not revealed. In patients with ST elevation myocardial infarction LDA damage is significantly higher in men, at the same time in men anatomical peculiarity of vessels is not the predictors of peri procedural complications. In spite of that, in women there is higher cases of RA damage, the risk factors of peri procedural complications of stent implantations is damage of anterior descending artery and multiple vessels.

Conclusion

Thus, according to study results, there are no considerable differences of peri procedural complications of stent implantation among gender. At the same time, the expressed gender differences of complications and damaged vessels anatomy are revealed.

References:

- Chen W., Woods SL., Puntillo KA. Gender differences in symptoms associated with acute myocardial infarction: a review of the research. *Heart Lung*. 2005 Jul-Aug; 34(4): 240-7.
- Hollenbeak CS., Weisman CS., Rossi M., Ettinger SM. Gender disparities in percutaneous coronary interventions for acute myocardial infarction in Pennsylvania. *Med Care*. 2006 Jan; 44(1):24-30.
- Jiang H., Ogden M., Bazzano L. et al. Risk factors for congestive heart failure in US men and women: NHANES I epidemiologic follow-up study // *Arch Intern Med*. 2001; 161: 996–1002.
- Leonetti G., Cuspidi C., Facchini M. et al. Is systolic pressure a better target for antihypertensive treatment than diastolic pressure? // *J Hypertens*. 2000; 18(suppl.3): S.13–S.20
- Milcent C., Dormont B., Durand-Zaleski I., Philippe G., Steg P B. Gender Differences in Hospital Mortality and Use of Percutaneous Coronary Intervention in Acute Myocardial Infarction. *Circulation*. 2007; 115:833–839.
- Molitero L. T., M. Moore J. W., Oliver-McNeil S. M., Popma J.J., Landzberg C., Laskey W.K. Angiography and Interventions Expert Consensus Document on Cardiac Catheterization Laboratory Standards Update, *J. Am. Coll. Cardiol*. 8, 2012.
- Patti G, Pasceri V, Nusca A, Di Sciascio G. [Prevention of periprocedural myocardial damage in patients undergoing percutaneous coronary intervention]. *Ital Heart J Suppl*. 2005 Sep; 6(9):553-60.
- Presbitero P, Carcagnì A. Gender differences in the outcome of interventional cardiac procedures. *Ital Heart J*. 2003 Aug; 4(8):522-7.
- Tillmanns H., Waas W., Voss R., Grepels E., Hölschermann H., Haberbosch W., Waldecker B. Gender differences in the outcome of cardiac interventions. *Herz*. 2005 Aug; 30(5):375-89.
- Zar J.H., *Biostatistical Analysis*. 5th Edition, 2009.
- Zhang B, Jiang DM, Sun YJ, Ren LN, Zhang ZH, Gao Y, Li YZ, Zhou XC, Qi GX;[The role of gender difference on the prognosis of ST-segment elevation myocardial infarction (STEMI) in patients treated with primary percutaneous coronary intervention]. *Zhonghua Liu Xing Bing Xue Za Zhi*. 2012 Jan;33(1):92-8.
- Zhou C., Yao Y, Zheng Z., Gong J., Wang W., Hu S., Li L. Stenting technique, gender, and age are associated with cardioprotection by ischaemic postconditioning in primary coronary intervention: a systematic review of 10 randomized trials. *Eur Heart J*. 2012 Aug 26.